

**OVERLOAD PROTECTION AND STABILITY FOR HIGH ORDER 1-BIT
DELTA-SIGMA MODULATORS**

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ABSTRACT OF THE DISCLOSURE

A combination of low order and high order filters and a rule-based 1-bit quantizer with multiple feedback paths and separate quantization output provide stabilization to a delta-sigma modulator during quantizer overload conditions. The 1-bit delta-sigma modulator system combines the superior in-band noise shaping properties of a high order delta-sigma modulator with the stability of a low order delta-sigma modulator to obtain a high order delta-sigma modulator with overload stability. The 1-bit quantizer operates in accordance with a set of primary quantization rules that enables high and low order delta-sigma modulators to work together and remain stable during overload conditions while minimizing performance degradation.